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TAXONOMIC STATUS OF THE SHREW, *NOTIOSOREX (XENOSOREX) PHILLIPSII* SCHALDACH, 1966 (MAMMALIA: INSECTIVORA)

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Among 129 mammals collected in southern Oaxaca in 1964 by Allan R. Phillips and William J. Schaldach, Jr., were four short-tailed shrews, all tentatively identified as *Cryptotis mexicana* (Coues). Schaldach later discovered that two of the specimens had only three "unicuspids" in each upper toothrow instead of four (the normal complement for Recent species of the genus *Cryptotis* Pomel). Further examination convinced him that three (one lacking skull) of the four specimens represented an undescribed taxon; he assigned the fourth to *Cryptotis mexicana machetes* (Merriam).

The only Recent New World shrews that normally have but three "unicuspids" in each upper toothrow are representatives of the genera *Notiosorex* Coues and *Megasorex* Hibbard, which many authors consider as congeneric (*Notiosorex* having priority). Although Schaldach (1966: 289–290) questioned the "natural validity" of dental formulae as criteria for generic determinations of shrews, he apparently failed to consider the possibility that his specimens might represent a genus normally characterized by the presence of more than three upper "unicuspids." Instead, he relied entirely on the dental formula for generic allocation and (*op. cit.*: 289) named and described *Notiosorex phillipsii*, setting it off in a separate subgenus (*Xenosorex*) characterized by its close resemblance to *Cryptotis* in characters other than number of teeth.

In his review of the Soricidae, Repenning (1967) placed

Notiosorex and *Cryptotis* in separate tribes (Neomyini and Blarinini, respectively) representing phylogenetic lineages that probably have been distinct since early Miocene time (*op. cit.*: 61). This naturally aroused questions as to the identity and status of *Notiosorex phillipsii*. Furthermore, my examination of the holotype and paratypes of *N. phillipsii* revealed that on the basis of external characters they cannot be distinguished from the specimen assigned to *C. mexicana* caught at the same locality, and that cranially the specimen of *mexicana* and the two *phillipsii* accompanied by skulls differ only in the presence or absence of the minute fourth upper "unicuspid."

To determine the correct generic identity of *phillipsii*, the one paratype (KU 114226) and the notes taken on the holotype (UNAM 8445) and the other paratype (UNAM 8447) were compared with representatives of each of *N. crawfordi* (Coues) and *N. evotis* (Coues), the two nominal species of *Notiosorex*, with *Megasorex gigas* (Merriam), and with representatives of four species of *Cryptotis*—*C. pergracilis nayaritensis* Jackson, *C. mexicana mexicana* (Coues), *C. goodwini* Jackson, and *C. magna* (Merriam). The four species of *Cryptotis* were chosen as representatives of morphologically distinct lineages within that genus. Characters used by Repenning (*op. cit.*) to distinguish the Blarinini (p. 37) and Neomyini (p. 45) were evaluated and then applied to the study of *phillipsii*. Characters used in diagnoses of the genera *Cryptotis* (p. 39), *Notiosorex* (p. 55), and *Megasorex* (p. 56) were treated in a like manner. Osteological and dental terminology and most of the diagnostic characters used herein are from Repenning (*op. cit.*), except that diagnostic characters have been modified slightly where necessary to encompass the range of variation in Recent taxa. The characters discussed below were chosen as most demonstrative of relationships.

Dental formula: In *Cryptotis* the dental formula is 1–5–3/1–2–3 in Recent species and all known fossil species except *C. adamsi* (Hibbard), in which it is 1–6–3/1–2–3. In *Notiosorex* and *Megasorex* the dental formula is 1–4–3/1–2–3, the same as in specimens of *phillipsii*.

Cingular structure of "unicuspids": In *Cryptotis* a more-or-less distinctly developed cingular cusp, usually pigmented, is situated on the posterior end of the lingual cingulum of each anterior upper "unicuspid." In *Notio-*

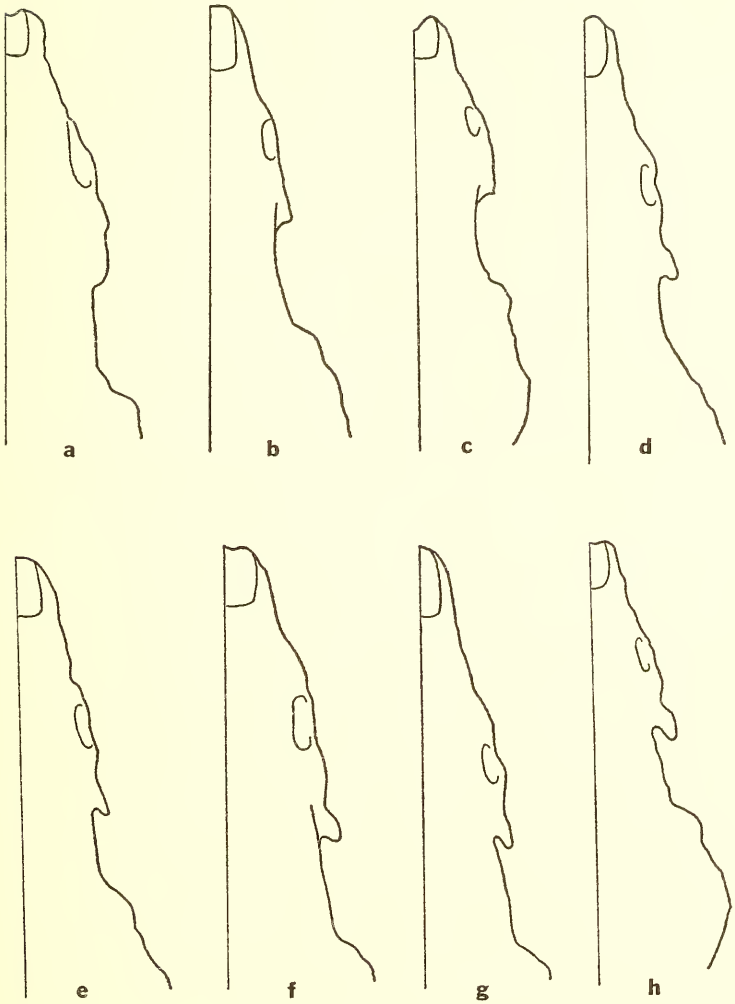

FIGURE 1.—Dorsal outlines of skulls of (a) *Megasorex gigas* (99538), (b) *Notiosorex evotis* (90581), (c) *N. crawfordi* (89210), (d) *N. phillipsii* (114226), (e) *Cryptotis mexicana mexicana* (29533), (f) *C. magna* (99539), (g) *C. goodwini* (64610), and (h) *C. pergracilis nayaritensis* (105408) showing degree of development of zygomatic process of maxillary. KU catalogue numbers (in parentheses) apply to respective drawings in Figs. 1–4.

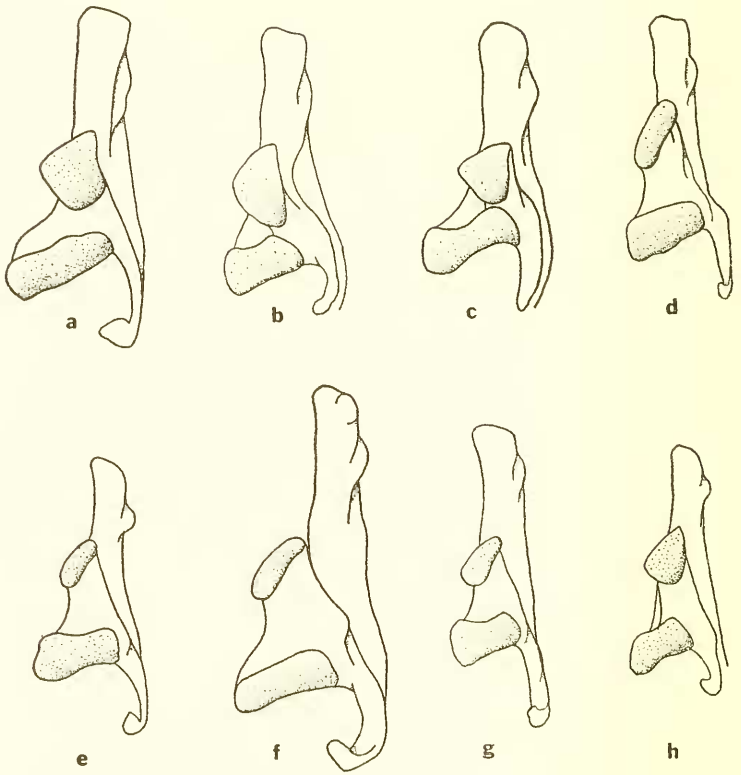

FIGURE 2.— Mandibular articulation in (a) *Megasorex gigas*, (b) *Notiosorex evotis*, (c) *N. crawfordi*, (d) *N. phillipsii*, (e) *Cryptotis mexicana mexicana*, (f) *C. magna*, (g) *C. goodwini*, and (h) *C. pergracilis nayaritensis*.

sorex and *Megasorex* the entire lingual cingulum may be elevated, forming a cingular ridge that never is pigmented. Pigmented cingular cusps are present in *phillipsii* and are similar to those in the species of *Cryptotis* examined.

Pigmentation of teeth: In *Cryptotis* all teeth except the fourth upper "unicuspid" are pigmented, the degree of pigmentation varying in different taxa. In *Notiosorex* the tips of the paracone of P4, protoconid of m1, and some of the more anteriorly-situated teeth are variably pigmented. In *Megasorex* pigmentation is lacking or at best slight. In *phillipsii* the tips of the teeth are pigmented as in *Cryptotis*.

Degree of development of zygomatic process of maxillary: In *Cryptotis* the zygomatic process of the maxillary extends posterior from a place

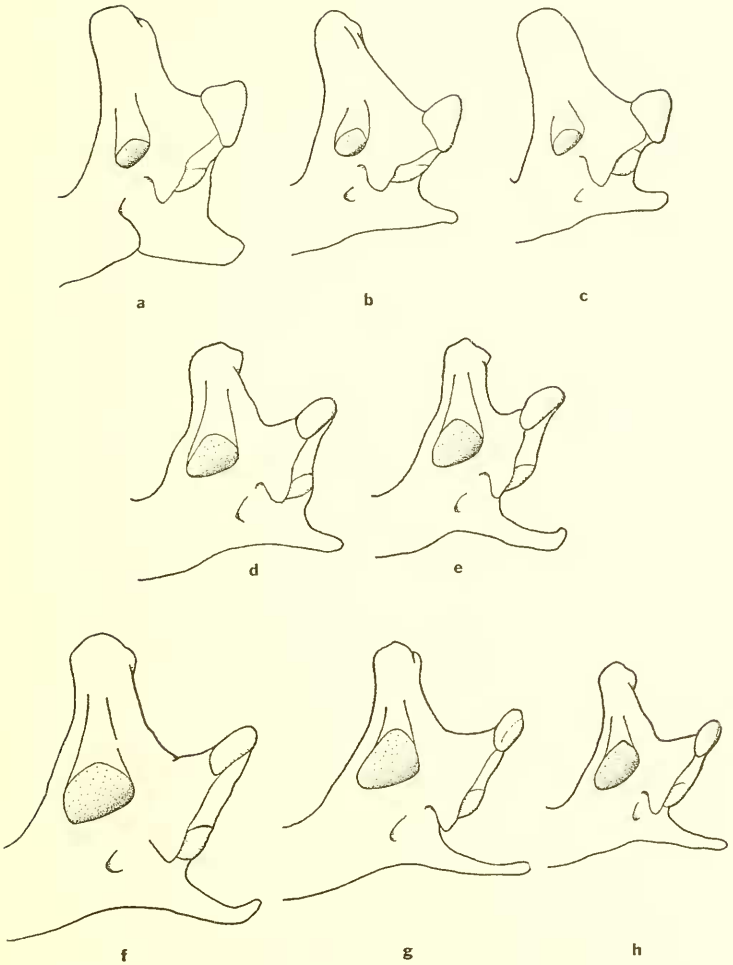

FIGURE 3.—Structure of internal temporal fossa in (a) *Megasorex gigas*, (b) *Notiosorex evotis*, (c) *N. crawfordi*, (d) *N. phillipsii*, (e) *Cryptotis mexicana mexicana*, (f) *C. magna*, (g) *C. goodwini*, and (h) *C. pergracilis nayaritensis*. Note, as in other figures, the similarity between *phillipsii* and *C. mexicana*.

opposite the metacone or metastyle of M2 as a short but distinct process from which the masseter muscle originates. In *Notiosorex* the process originates opposite the metastyle of M2 and either does not extend posteriad (*N. crawfordi*) or does so only as a minute process that probably

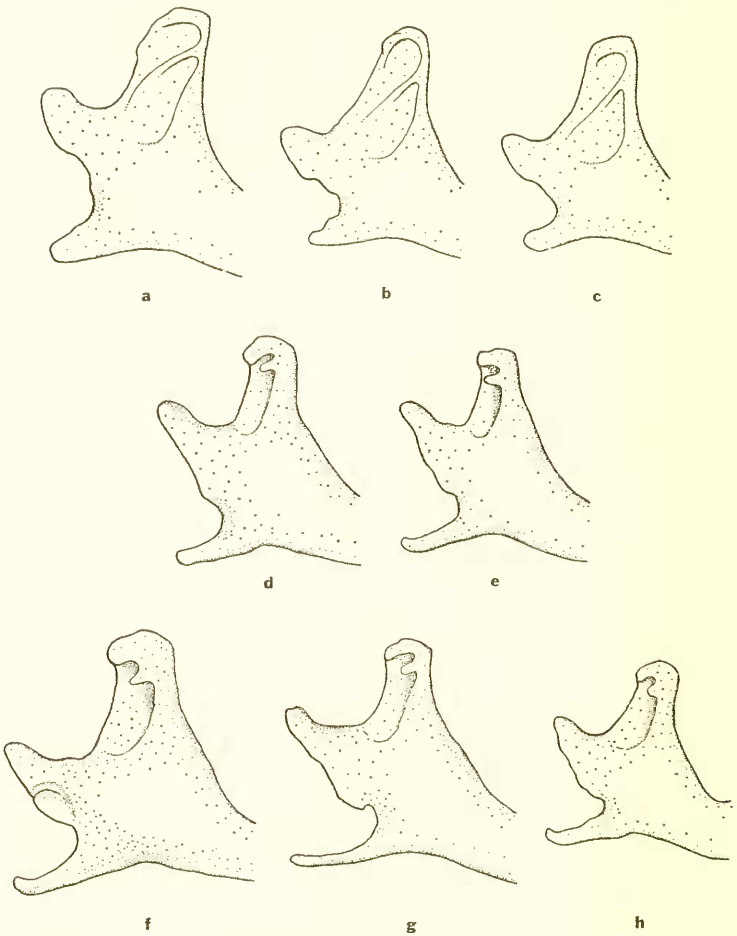

FIGURE 4.—Location of external temporal fossa in (a) *Megasorex gigas*, (b) *Notiosorex evotis*, (c) *N. crawfordi*, (d) *N. phillipsii*, (e) *Cryptotis mexicana mexicana*, (f) *C. magna*, (g) *C. goodwini*, and (h) *C. pergracilis nayaritensis*.

lacks significant muscular attachment (*N. evotis*). In *Megasorex* the process originates posterior to M2 and does not extend posteriad. In *phillipsii* the zygomatic process of the maxillary originates and extends posteriorly as in *Cryptotis* (Fig. 1).

Mandibular articulation: In *Cryptotis* the lingual condylar emargination is at least partially (usually considerably) filled with bone, varying

in different species, so that the interarticular area is broad. In *Notiosorex* and *Megasorex* the lingual condylar emargination is not filled, resulting in a narrow interarticular area; the lower condyle is offset lingually (more so than in *Cryptotis*) from the lower sigmoid notch, and is usually separated from that notch by a small groove. In *phillipsii* the mandibular articulation is identical with that of *Cryptotis* (Fig. 2).

Structure of internal temporal fossa: In *Cryptotis* the internal temporal fossa tends to be large, triangular, and excavated dorsally in such a fashion that a basin is formed above the fossa proper. In *Notiosorex* and *Megasorex* the fossa tends to be small, deep, and round, lacking all but a hint of excavation. The structure of the internal temporal fossa in *phillipsii* is identical with the condition found in *Cryptotis* (Fig. 3).

Location of external temporal fossa: In all species examined of *Cryptotis* the external temporal fossa is situated high on the coronoid process, extending down no farther than the superior sigmoid notch. In *Notiosorex* and *Megasorex* the fossa is situated low on the coronoid process, the ventral margin often extending as low as the lower articular facet. In *phillipsii* the fossa is situated as in *Cryptotis* (Fig. 4).

As shown above, specimens referred to "*Notiosorex* (*Xenosorex*) *phillipsii*" clearly share morphological affinities, excepting dental formula, with *Cryptotis* rather than *Notiosorex*. Examination of the specimens of *Cryptotis mexicana* mentioned above and of additional material (ENCB 3413–14; AMNH 213758–59, 214152, 214803–06, 214808–09; UMMZ 112572) from near the type locality of *phillipsii* demonstrated that the fourth upper "unicuspid" is variable in size and development in that population, and that absence of the tooth does not constitute a valid taxonomic character even at the subspecific level. Therefore, *Xenosorex* hereby is transferred to the genus *Cryptotis* (in which it becomes an available junior synonym), and *phillipsii* is placed in the synonymy of *Cryptotis mexicana peregrina* (Merriam). The complexities of specific allocation of the nominal subspecies of *C. mexicana* is beyond the scope of the present paper, but will be discussed in a forthcoming review of Middle American shrews of the genus *Cryptotis*.

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